International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 6 Issue 3, March 2019

ISSN: 2394-4404

Impacts Of Poaching And Charcoal Production On Wildlife Conservation In Kahuzi-Biéga National Park, Democratic Republic Of Congo

N. N. Gatambara

Department of Biological and Environmental Sciences, Kampala International University, Kampala, Uganda

A. Adamu

Department of Basic Sciences, College of Agriculture Gujba, Yobe State, Nigeria

M. Babagana

Department of Animal Health and Production Technology, College of Agriculture Gujba, Yobe State, Nigeria

Hussaini I.

Department of Agricultural Technology, College of Agriculture Gujba, Yobe State, Nigeria

Alkali U. U.

A. Gujja

Department of Forestry Technology, College of Agriculture Gujba, Yobe State, Nigeria

Abstract: *A Study on assessment of the effects of poaching and charcoal production on wildlife conservation in Kahuzi-Biéga National Park in the Democratic Republic of Congo was conducted between the months of October-December, 2018. It made use of Descriptive Research design involving mixed methods. The target population was 250 people while the sample size obtained by using the Slovenes formular stood at 154 respondents. Systematic random, Purposive and Accidental sampling techniques were used to sample the respondents. Closed ended questionnaires, Key Informant and Individual Interview Guide as well as Focused Group Discussions were the data collection instruments adopted while quantitative data was analysed in SPSS Version 20 using Descriptive Statistics and Pearson Linear Correlation Coefficient, qualitative data was analysed using Content Analysis method. Results on respondents' demographic characteristics revealed that the majority of them were male youth within the age group of 15-45 years mainly engaged in occupations with strong links to the forest resources. Educationally, they could not be termed as illiterates and were original indigenes of the area with vast knowledge of the surroundings having resided there for many years. It was also discovered that poaching activities do take place in and around the park mainly sparked by the demand for animal parts such rhino horns and elephant tusks as well as poverty. A significant relationship was found to exist between poaching activities and many of the problems bedeviling conservation efforts in the park (0.766 at 0.01 level of sig., 2-tailed). Poaching in the park was carried out mainly by the local inhabitants although foreigners were also incriminated in the act. African elephants, monkeys, rhinos and antelopes were the mostly poached wildlife animals. Impacts of poaching revealed include depopulation of wildlife species, environmental pollution, and decreased tourism among others. Similarly, charcoal productions was also found to be practiced in and around the park mainly carried by the local people living around the park triggered by the high demand for charcoal, weak rules and regulations as well as poverty. Major impacts of it discovered include loss of vegetation cover, loss of wildlife habitats, deforestation etc. Some measures believed by the local people to be effective in curtailing the menace include issuance of licenses, compensations, provision of entrepreneurial skills for the locals etc. Thus, based on the outcomes of this study, it was concluded that, if the current scale of poaching and charcoal production are allowed to continue unchecked in and around Kahuzi-Biéga National Park, the numerous negative consequences inherent with these illegal activities will continue to escalate as well with resultant devastating impacts on the conservation of wildlife species and all other natural resources in the reserved area. Hence, the rationale behind the establishment of the National Game Reserve which include conservation of wildlife species especially the endangered ones, enhancement of tourism, creation of jobs as well as generation of revenue will be severely affected. Hence, in order to bring an end to these environmentally devastating human activities in the park, it was proffered that strict control measures such as the enaction of laws, awareness raising campaigns for the locals, use of modern anti-poaching and charcoal production strategies such as CCTV etc. could be employed.*

Keywords: *Poaching, Charcoal production, Wildlife Conservation, Kahuzi-Biéga National Park.*

I. INTRODUCTION

Wildlife Conservation is the practice of protecting wild plant and animal species and their habitats. The goal of wildlife conservation is to ensure sustainable use of resources such that nature will be around for future generations to enjoy and also to recognize the importance of wildlife and wilderness for humans and other species alike. Wildlife

conservation has become an increasingly important practice due to the negative effects of human activity on wildlife especially on endangered species. An endangered species is defined as a population of a living species that is in the danger of becoming extinct because of several reasons (Johnson *et al.*, 2005).

International organisations and governments all over the globe enact laws in their quest to ensure the conservation of natural resources, The World Conservation Strategy was developed in 1980 by the "International Union for Conservation of Nature and Natural Resources" (IUCN) with advice, cooperation and financial assistance of the United Nations Environment Programme (UNEP) and the World Wildlife Fund and in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO)" The strategy aims to "provide an intellectual framework and practical guidance for conservation actions. In 2010, the Government of India enacted a law called the Wild Life (Protection) Act. Wildlife conservation has become an increasingly important practice due to the negative effects of human activity on wildlife such as poaching. Poaching is the illegal hunting or capturing of wild animals usually associated with land use rights. It is usually undertaken for reasons that may include revenge, meat for food or sale, tradition or money.

Fewer natural wildlife habitat areas remain each year due to high demand for human settlement and other human activities that exert pressure on wildlife habitats. Moreover, the habitat that remains has often been degraded to bear little resemblance to the wild areas which existed in the past. Habitat loss—due to destruction, fragmentation and degradation of habitat—is the primary threat to the survival of wildlife in the United States and in sub Saharan Africa (Burger *et al*., 2004). It is evident that human activities affecting wildlife and their habitats are pervasive and increasing world over. Effects of these activities are manifested at all ecological scales, from short-term changes in the behavior of an individual animal through local extirpations and global extinctions (Henson & Grant 2009). Consequently, understanding the effects of humans on wildlife and wildlife populations, as well as devising strategies to overcome these effects, is an increasing challenge for resource managers. Given the conflicting mandate to both encourage human use and to protect sensitive natural resources in national parks, developing reliable strategies for assessing and monitoring the effects of human activities on natural resources is essential in ensuring appropriate stewardship of these resources (Green 2010).

According to Francl & Schnell (2012), virtually all human activities can affect wildlife populations either positively or negatively. Those activities that are likely to have adverse effects can be divided into two; those that function primarily by altering the physical environment in a relatively permanent way and those that cause changes to an animal's behavior. Activities that alter the physical environment change the amount or the suitability of habitat for a species. Widespread and large-scale examples include activities that directly alter the structure and composition of the landscape, such as agriculture, forestry, livestock grazing, and unregulated off-road vehicle use. Although the interactions of human activities with wildlife are typically of short duration, cumulatively they can effect wildlife populations adversely in both the short- and long-term (Burger 2010; Henson and Grant 2009). Johnson *et al.*, (2005) stated that, the effects include increased energetic stresses, changes in activity budgets, displacement from preferred environments, and reduced productivity through abandonment and decreased survival of young.

BACKGROUND TO THE STUDY

Humans are continually expanding and developing, leading to an invasion of wildlife habitats. As humans continue to grow, they clear forested land to create more space which stresses wildlife populations as there are fewer homes and food sources to survive off (Gregorian & Buhyoff 2010). Johnson *et al.*, (2005) stated that, the increasing population of human beings is the most major threat to wildlife. More people on the globe mean more consumption of food, water and fuel, thus, more waste is generated as well. Every major threat to wildlife as seen above is directly related to increasing population of human beings; if the human population is altered so that is the amount of risk to wildlife. The less is the population; the less is the disturbance to wildlife.

Tropical forests are among the most beautiful and biologically rich environments in the world. While forest reserves are considered safer for wildlife than unprotected areas, they provide far less conservation value than national parks – largely because of human activities in the reserves (Noon 2003). Colin Chapman (2009), a professor of Anthropology at McGill University worked in the tropics for over 35 years documenting the devastation that is occurring in these important areas. Recently, Chapman investigated the relationship between human activities and the declining number of animals such as chimpanzees, elephants, and giant forest hogs within four forest reserves in Uganda. These Ugandan reserves allow firewood collection, timber cutting, gardening, and pole cutting. Illegal hunting also takes place. Chapman found a significant decline in animals in the reserves compared to the better protected adjacent Kibale National Park. "This decline is very likely due to a combination of the forest degradation and hunting that is occurring in the forest reserves, but not in the national park," says Chapman.

Unregulated hunting and poaching cause a major threat to wildlife, along with this, mismanagement of forest department and forest guard's triggers this problem (Mann & Dalton 2011). According to Holthujjzen (2013), wildlife poaching has negative side effects that affect local communities, wildlife populations, and the environment. It is a crime fueled by a lucrative black market trade of animal parts. The animal parts are sold as novelty items and are sold for their "medicinal" properties. Poachers kill for profit, for example, bear gall bladders and big horned sheep antlers are worth top dollar for their so-called medicinal properties. This past November, at the National Wildlife Property Repository in Colorado, the wildlife service destroyed six tons of ivory confiscated at U.S. borders. Elephants are killed for their tusks because, while it is possible to remove the tusks without killing the elephant, they are too dangerous to remove when they are alive. The international community is responding. China recently

increased its prosecutions of ivory smugglers, sentencing eight citizens to jail for bringing in over 3 tons of ivory between 2010 and 2012 (World Life conservation report 2009).

The United States is second to China in its desire for illegal wildlife parts. According to an On Earth article, poachers killed over 30,000 elephants last year. Experts believe that elephants will go extinct within the next decade if the killing continues at this rate. The extinction of a species can have a negative economic effect on a local community's tourism industry (Hess & Hess-Orthmann, 2012). A community that relies on its wildlife to attract tourists is at great risk for economic hardship if the prevalence of poaching is high. Furthermore, a tourist boycott due to local poaching is a real threat. A boycott could have a detrimental effect on a community's economy since restaurants, hotels, rentals, and other attractions would suffer. Extinction is the greatest threat to animals that are victims of wildlife poaching. In 2011, the International Union for the Conservation of Nature (IUNC) declared the Western Black Rhinoceros extinct. This subspecies of the critically endangered Black Rhino was poached due to the belief in the healing properties of its horn (Gerrodette, 2009).

Similarly, Steidl (2001) reported that, Poaching is also dangerous to the environment, when the North American Gray Wolf was on the brink of extinction due to trophy hunting and poaching, the elk populations in Yellowstone National Park soared. With no natural predator, the elk nearly ate the aspen tree to extinction. The economic challenges of a community can lead to poaching, which in turn can lead to endangerment (and in the worst cases, extinction) of different species. We need various species of flora and fauna in our environmental ecosystems so that it can maintain healthy and balanced (Anthony *et al.,* 2009). Corruption, toothless laws, weak judicial systems and light sentences allow criminal networks to keep plundering wildlife with little regard to consequences. These factors make illegal wildlife trade a low risk business with high returns. The poachers—often poor locals—are the usually the only ones caught, leaving the real masterminds and their network safe and operational with the ability to strike again (Mathisen 2014).

In the same vein, charcoal production which is a very lucrative business in many parts of the world especially in developing countries with abundant forest resources is posing significant threat to the survival of many wildlife species. According to Lichstein & Franzreb (2002), over 90% of all charcoal consumed all over the world comes from overseas, predominantly the endangered tropical rainforest and mangrove habitats of South America, West Africa and South East Asia. In addition to the damage caused by unsustainable forestry practices in these regions, is the negative environmental impact arising from the consumption of fossil fuels transporting charcoal so far around the world. According to Boyle & Sampson (2008), two main direct causes of land degradation in the Democratic Republic of Congo (DRC) are overuse of vegetation and agricultural intensification.

Over exploitation of vegetation occurs mainly through gathering wood for fuel, fencing and construction materials, over grazing of livestock and charcoal production which affects wildlife habitats as most of them are displaced and other die due to starvation and poaching. This is an un-controlled activity which selectively clears trees cover (especially *Acacia busei*). Its effects are further complicated by the diminishing natural resilience of the vegetation occasioned by frequent and prolonged drought in the last few years (Fraser & Mathisen, 2012). Although the effects of extensive charcoal production may not directly affect wildlife species especially animals, it does so through the numerous effects it has on the environment particularly reduced habitats, reduced rangeland carrying capacity, biodiversity depletion, soil erosion, land degradation and gully formation (Trivers, 2010).

Furthermore, worldwide, humans are increasingly building houses in natural and semi-natural ecosystems, and this means that a further increase can be expected in the coming decades in the extent of the human settlement and in the magnitude of the detrimental processes associated with it. According to Andrew Hansen (2010), even small human settlements in rural areas can exert an ecological impact on a much larger area. He further added that the effects of rural homes on native species' population dynamics can be felt tens to hundreds of kilometers away. A small village, for example, could provide a sheltered habitat during extreme conditions for species that would otherwise be forced to migrate elsewhere. In this way, the ecological makeup of a wider area is disrupted. This can affect conservation efforts within nearby protected areas, such as Yellowstone National Park, where Hansen has conducted research. "Human-caused mortality of grizzly bears on private lands may threaten bear populations in Yellowstone National Park," he explained. Bears are free to cross the borders of the park; culling the animals on private land therefore reduces the numbers that enter the park (Forsyth C & Forsyth Y 2009).

In Africa as a region, the increased human population has led to the expansion of human settlements in protected wildlife habitats. This has led to the constriction of species habitats (Caruthers 2007). According to Noon (2003) Human activities around and within national parks are on the increase and need to be given due consideration in order to minimize future conflicts as human activities can have adverse impact on wildlife and humans alike.

STATEMENT OF THE PROBLEM

Certainly, human activities in and around restricted areas for wildlife conservation is a growing problem in today's crowded world and can have significant impacts on the wildlife populations in Kahuzi-Biéga National Park in Democratic Republic of Congo. According to Grier (2009), human activities cause physical changes to park environments, such as construction of building and roads, or vegetation destruction resulting from overuse of particular areas. Evidently, in and around the Kahuzi-Biéga National Park in the Democratic Republic of Congo, human activities such as establishment of human settlements, poaching, farming, fishing, fuel wood harvesting and charcoal production are so prominent nowadays sometimes leading to deadly conflicts between humans and the wildlife with resultant casualties on both sides. Possibly, such human activities could have negative impacts of the population and habitats of these wild species. According to Gibson (2009), most vulnerable species

in the National Park include African elephants *(Loxodonta Africana*), baboons (*Papio anubis),* green parrots (*Poicephalus senegalus)* and warthog (*Phacochoerus aethiopicus*). Species most exposed to human activities are shown to be more prone to extinction because of injury and death caused by humans (Janmejay and Prakash, 2015).

In order to bring an end to the menace of human activities in and around Kahuzi-Biéga National Park which was formerly a hunting wildlife reserve owned by local communities and controlled by village leaders, government imposed great restrictions on land use as well as laws governing hunting and the prevention of poaching, fuel wood harvesting and charcoal production. At present, local people's activities such as small-scale agriculture, livestock rearing, fishing, hunting and gold mining are restricted to a transitional area surrounding the park's border. However, despite the application of different management practices, both locally and globally, the problem still exists.

Thus, it is against this background that this study was initiated with sole aim of studying the impacts of poaching and charcoal production on wildlife conservation in and around the Kahuzi-Biéga National Park in the Democratic Republic of Congo.

STUDY AREA

The study was carried out in Kahuzi-Biega National Park which is a protected area near Bukavu town in eastern Democratic Republic of Congo. It is situated near the western bank of Lake Kivu and the Rwandan border. With an area of 6,000 square kilometres (2,300 sq. mi) lying between 28.45 ^{o}E – 28.85 ^{O} E of longitude and 2.66 ^{o} S. Kahuzi-Biega is one of the biggest National Parks in the country. Set in both mountainous and low land terrain, it is one of the last refuges of the rare species of Eastern low land gorilla (*Gorilla beringei graueri*), an endangered category under the IUCN Red List.

The park has a rich diversity of flora and fauna and provides protection to 1,178 plant species in the mountainous region of the park, with some 136 species of mammals 349 species of birds, as of 2003. The park's swamps, bogs, marshland and riparian forests on hydromorphic ground at all altitudes are rare worldwide. The western lowland sector of the park is dominated by dense Guineo-Congolian wet equatorial rainforest, with an area of transition forest between 1,200 metres (3,900 ft) and 1,500 metres (4,900 ft). Among the 136 species of mammals identified in the park, the eastern lowland gorilla is the most prominent. According to a 2008 status report of the DR of Congo, the park had 125 lowland gorillas, a marked reduction from the figure of 600 gorillas of the pre-1990's conflict period, and consequently the species has been listed in the endangered list. The park is the last refuge of this rare species. According to the census survey of eastern lowland gorillas reported by the Wildlife Conservation Society in April 2011, at least 181 gorillas were recorded in the park.

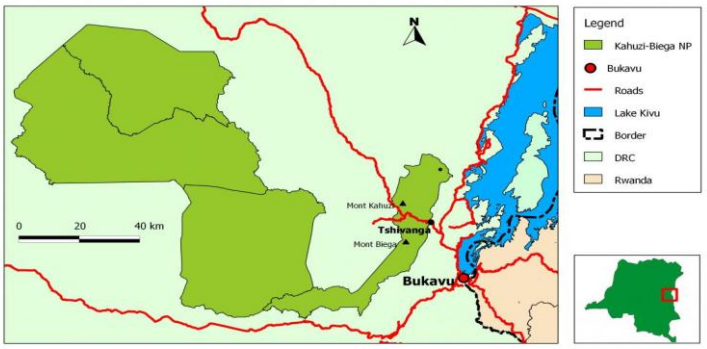

Figure 1: Map showing Kahuzi-Biega National Park in DRC

II. MATERIALS AND METHODS

This study was conducted in the months of October-December, 2018 to establish how poaching and charcoal production have affected wildlife conservation in Kahuzi-Biéga National Park in the Democratic Republic of Congo. It made use of Descriptive Research design involving mixed methods. The target population was 250 people while the sample size obtained by using the Slovenes formular stood at 154 respondents comprising of 109 representatives of the local community members, 6 staff of the IUCN, 12 NGO staff, 12 cultural leaders as well as 15 local government representatives. Systematic random, Purposive and Accidental sampling techniques were used to sample the respondents. Closed ended questionnaires, Key Informant and Individual Interview Guides as well as Focused Group Discussions were the data collection instruments adopted while quantitative data was analysed in SPSS Version 20 using Descriptive Statistics and Pearson Linear Correlation Coefficient, qualitative data was analysed using Content Analysis method.

III. RESULTS AND DISCUSSIONS

DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

This section determines demographic characteristics of the respondents in terms of gender, age, education level, occupation, family sizes and years of residence in the area. The table below presents these characteristics:

Variables	Frequency	percentage
Sex		
Male	92	59.7
Female	62	40.3
Age		
15-25 yrs	23	14.9
26-35 yrs	53	34.4
36-45 yrs	35	22.7
46-55 yrs	16	10.4
56-65 yrs	18	11.7
Above 66 yrs	9	5.8

Occupation		
Crop farming	14	9.1
Livestock farming	24	15.6
Hunting	23	15.0
Charcoal production	21	13.6
Firewood harvesting	22	14.3
Fishing	13	8.4
Civil service	15	9.7
Trading	4	2.6
Others	18	11.7
Alternative occupation		
None	20	13.0
One	54	35.1
Two	44	28.6
Three	36	23.4
Level of education		
None	20	13.0
Primary	32	20.8
Secondary	54	35.1
Diploma	24	15.6
Bachelors	18	11.7
Post graduate	6	3.9
Years of residence in the area		
1-10 years	11	7.1
11-20 years	23	15.0
21-30 years	45	29.2
31-40 years	55	35.7
41-50 years	11	7.1
Above 51 years	9	5.8
Family size		
1-5	24	15.6
6-10	46	29.9
11-15	32	20.8
16-20	19	12.3
More than 21	33	21.4
TOTAL	**154**	**100**

Source: Field study, 2018

Table 4.1: Demographic characteristics of the respondents

With respect to demographic characteristics of the respondents, the majority of the respondents (72.0%) were youth within the age group of 15-45 years. As it is the case in many rural African settlements, bulk of them (76.0%) were engaged in occupations with direct link to natural land, forest and water resources such as crop and livestock farming, hunting, fire wood harvesting etc. Besides, 87.1% of the respondents had more than one occupation all of which had direct link to natural resources in and around the Park. This could be attributed to the abundance of natural resources in the area. With respect to the respondents' level of education, 13.0% were uneducated while another 55.9% had only primary or secondary education. Diploma holders constituted 15.6%, Bachelors' degree holders 11.7% while those possessing post graduate certificates were represented by 3.9%. This signifies that the majority of them were not well educated; a reason good enough to make them unable to secure white collar jobs elsewhere as a result of which they had to stick to the traditional occupations inherited from their fore fathers most of which are destructive to the environment. In addition, by lacking the required basic education, it will be very difficult for them to realize the relationship between their activities and the environment in which they live hence; they could hardly envisage the extent of the impacts of activities such as charcoal production and poaching on the conservation of wildlife in the Park.

Meanwhile, majority of the respondents (92.9%) were indigenous residents of the area who have resided there for many years ranging from 11 years to more than 50 years. Thus, the respondents possess a very good knowledge of the Park's flora and fauna as well as the geography of the forests which enhances their ability to actively manipulate natural resources around them and maneuver in the forests. Family sizes were also found to be large ranging from 6-20 (84.4%). This is common in many African rural areas and a testimony that the local men have big families to cater for. This could be the reason why majority of the respondents did engage in more than one occupation.

IMPACTS OF POACHING ON WILDLIFE CONSERVATION IN KAHUZI-BIÉGA NATIONAL PARK

The table below presents responses obtained from the respondents on whether poaching is carried out in the Park.

Options	Frequency	Percent
Yes	116	75.3
No	38	24.7
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.2: Determining if poaching is carried out in the park

An overwhelming agreement was made by the respondents that poaching really takes place in the Park with a 75.3% acceptance. Many reasons were given by the local community members as to why they engage in poaching within the premises of the Park. Many other studies have confirmed that poaching activities take place in protected areas. According to the Uganda Wildlife Authority (UWA), recently there has been a spate of press reports in print and electronic media, including The New Vision, on increasing illegal activities in the protected Areas with particular emphasis on rampant poaching which has affected the population of the wildlife in national parks and wildlife reserves. Of particular concern was a special report reinforced with an editorial opinion in the Saturday Vision of September 1, 2012 under the headline "25 Elephants killed in 2011 as poachers go on rampage" and the editorial titled "Let us deal with poaching decisively" (www.ugandawildlife.org).

Reasons	Frequency	Percent
Demand for animal parts	40	26.0
Poverty among the locals	50	32.5
Availability of wild life resource	20	13.0
Weak regulations/laws	15	9.7
Corruption	10	6.5
Need for food	19	12.3
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.3: Reasons For Increased Poaching In The Park (Multiple Responses, N=154).

As stated above, the respondents cited some reasons as to why poaching was carried in the Park although not all those engaged in the poaching exercise were local people. Among the reasons cited, poverty got the highest percentage of 32.5% followed by the demand for animal parts which got 26.0%. Perhaps, the demand for animal parts such as rhino horns, elephant tusks, leopard skins etc. might be a major reason fuelling the problem of poaching in many parts of the globe. It has been described as a lucrative business worth millions of dollars taking place in areas with considerable population of wildlife species. Holthujjzen (2013) stated that it is a crime fueled by a lucrative black market trade of animal parts. In 2017, the National Wildlife Property Repository of Democratic Republic of Congo through its wildlife service destroyed six tons of ivory confiscated at DRC borders.

Other reasons given were sufficient availability of wildlife resources (13.0%), ineffective regulations (9.7%), corruption (6.5%) and need for food (12.3%). It is very clear that, in every community where laws and regulations tend to be weak, criminal activities do flourish. It was discovered that poaching in the National Park was majorly attributed to Corruption, toothless laws, weak judicial systems and light sentences which allow criminal networks to keep plundering wildlife with little regard to consequences. These factors make illegal wildlife trade a low risk business with high returns. The poachers often poor locals are usually the only ones caught, leaving the real masterminds and their network safe and operational with the ability to strike again (Mathisen, 2014). Besides, most of the local people mainly engage in poaching out of poverty considering the fact majority of them have big families to cater for. This category of poachers tends not to pose more serious threats to wildlife conservation as the commercial poachers. According to Obour *et al.,* (2016), Poaching poses a growing problem for wildlife tourism development in Ghana as it pertains to other countries in the sub region. Henk (2005) cited in Obour *et al.,*(2016) identified three types of poaching behaviors in Sub-Saharan Africa: subsistence, trophy and commercial. Subsistence poachers are those who hunt wildlife illegally as food sources. This practice includes the taking of animals including duikers and buffaloes (Henk, 2005 cited in Obour, *et al.,* 2016). Subsistence poachers pose very little, if any, threat to wildlife. However, subsistence poaching is expanding to incorporate large scale killing and trading of endangered species (Lemieux and Clarke, 2009 cited in Obour, *et al.,* 2016) and could eventually rival commercial poaching in very destructive ways. The primary objective of trophy poachers is to collect the best possible animal trophies for a personal collection or in some cases to sell the heads, antlers and hides of trophy animals for profit (Blevins and Edwards, 2009; Eliason, 2013 cited in Obour, *et al.,* 2016). Additionally, hunters who have an obsession with trophy animals are more likely to be involved in poaching behaviors. Trophy poachers are not a serious threat in Ghana. The major threat to the survival of endangered wildlife species in Ghana is the threat from commercial poachers and the new breed of subsistence poachers involved in the large scale trade in endangered wildlife species

Similarly, these findings also agree with that of Mann & Dalton (2011) who stated that Poachers might be poor locals from the area to foreigners capitalizing on the lucrative illegal wildlife trade. Besides, the high demand for what is referred to as bush meat makes poaching a very lucrative business in many of Park. In most cases, increased poaching were attributed to economic challenges prevailing in the surrounding communities and more often than not endangered species fall victims thereby compounding the issue of endangerment (and in the worst cases, extinction) of different species.

CATEGORIES	Frequency	Percent
Foreigners (unknown)	40	26.0
Local people	89	57.8
Game Rangers	25	16.2
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.4: Categories Of People Involved In Poaching In The Park (Multiple Responses, N=154).

Findings with regards to this indicates that local people are the ones usually incriminated in poaching in and around the Park (57.8%) possibly due to abject poverty while foreigners mostly unknown to the locals who could be coming from other places or even other countries constituted 26.0%. According to the respondents these foreigners who could be considered as commercial poachers usually operate as organized syndicates using sophisticated weapons. This category of poachers were believed to be the most dangerous of all categories of poachers in and around the Park because when they strike they kill large number of wildlife especially elephants and rhinos. Unexpectedly, Game Rangers bestowed with the responsibility of guarding the Park against illegal intruders were also incriminated in the illegal poaching activities in the National Park (16.2%). The involvement of locals in poaching activities especially in protected areas has been documented by many other scholars. For instance, in a report by the Guardian May, 2016, local men are at the bottom rung of a network of organized crime that is devastating Africa's wildlife which stretches from the remote wilds of Kenya to the port of Mombasa and out to China and South-east Asia, where an affluent middle class buy ground-up rhino horn as a status symbol and ivory is carved and sold as ornaments and trinkets. The report further stated that, the men who kill in the field are relatively easy for the Kenya Wildlife Service and private ranchers to catch, compared with middle men and kingpins orchestrating the trade (www.thegurdian.com).

It was further revealed that the Game rangers working for the Park do also engage in poaching in collaboration with some unscrupulous staff of the National Park including supervisors. Most of the times, the Game rangers were contracted by organized bodies involved in poaching to kill the animals mostly for their parts, medicinal purposes etc. For instance, elephants are killed for their tusks (ivory), Rhinos are killed for their horns, bear gall bladders and big horned sheep antelopes are worth top dollar for their so-called medicinal properties. Usually, wildlife body parts such as ivories are exported from the developing countries to many developed nations where they are processed into other products. For instance, at the National Wildlife Property Repository in Colorado, U.S.A., the wildlife service destroyed six tons of ivory confiscated at U.S. borders. Although it is possible to

remove the tusks without killing the elephant, they are too dangerous to remove when they are alive.

SPECIES	Frequency	Percent
Elephants	80	51.9
Monkeys	69	44.8
Rhino	47	30.5
Leopards	14	9.1
Antelopes	58	37.7
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.5: Species Of Wild Animals Mostly Poached In The Park (MULTIPLE RESPONSE, N=154)

Findings on species of wildlife mostly poached in the park revealed that African elephant were the most widely poached wildlife species in the Park (51.9%). This finding agrees with reports made by other scholars. According to an On Earth article, poachers killed over 30,000 elephants last year. Experts believe that elephants will go extinct within the next decade if the killing continues at this rate. The extinction of a species can have a negative economic effect on a local community's tourism industry (Hess & Hess-Orthmann, 2012). Following elephants as the most widely poached species in the park were monkeys (44.8%), antelopes (37.7%), rhino (30.5%) and leopards (9.1%). Elephants happened to be the number victim of poaching in the Park possibly because of the high demand of ivory in the world markets. The demand for elephants products, make illegal wildlife trade a low risk business with high returns in many parts of the world. Poachers in this area use weapons such as guns, spears, bow and arrows, traps, or even poisons etc. in attacking the innocent animals. Poachers and non-state actors (e.g. rebel movements such as The Lord's Resistance Army have introduced a more lethal and destructive dimension to the plunder of wildlife. The brutal actors target elephants and rhinos with more sophisticated weaponry and technology to fund domestic insurgencies and never-ending civil wars. Incidents of poaching committed by terrorist groups occur in several (Obour, 2015).

These findings agree with many reports on most poached wildlife species in many areas. For instance, it was reported that the top most poached wildlife animals in Africa include African elephant, rhinos, tigers, gorillas, and sea turtles (www.globalcitizen.org). Between 2010-2012, nearly 100,000 African elephants were killed while between 2009-2014, 170 tonnes of ivory were illegally exported out of Africa. Besides, in 2015, the report stated that, 1300 rhinos were killed in Africa (www.globalcitizen.org). Mostly, monkeys and antelopes were hunted as source of meat for many locals around the Park while rhinos were hunted for their horns which are also on high demand in many parts of the world. Besides, very good number of the local poachers stated that they earn good amounts of money from selling monkeys and antelopes which serve as delicious bush meat to many people especially in southern part of Nigeria.

OPTIONS	Frequency	Percent
Yes	140	90.9
No	14	9.1
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.6: Response On Whether Poaching Has Negative Impacts On Wildlife Conservation In The Park

Nevertheless, the majority of the respondents (90.9%) did agree that poaching entails numerous negative impacts on the conservation of wildlife in the Park, they may not be educated enough to determine the extent of such impacts while only 9.1% of them claimed to be oblivious of the impacts of poaching on conservation of wildlife in the Park stating that hunting of animals is a culture they inherited from their fore fathers and does not affect the environment in anyway. Holthujjzen (2013) argued that wildlife poaching has negative side-effects that affect local communities, wildlife populations, and the environment.

IMPACTS	Frequency	Percent
Depopulation of wild animals	154	100.0
Environmental pollution by animal carcasses	87	56.5
Increase in stray animals	65	42.2
Decreased tourism	143	92.9
Increase in injured animals	132	85.7
Killing of wildlife	154	100
Drop in the Park's revenue	99	64.3
Death of poachers which led to reprisal attacks on wildlife by local people	65	42.2
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.7: Impacts Of Poaching On Wildlife Conservation In The Park (MULTIPLE RESPONSE, N=154)

Pearson Linear Correlation Coefficient (PLCC) results for correlation of poaching activities and the impacts they have on wildlife conservation in the National Park revealed significant relationship; 0.766 at 0.01 level of significance (2-tailed).

Although most of the respondents might not be educated enough to know how destructive the impacts of poaching might be wildlife conservation or what consequences such impacts could have, they believed that it impacted the environment especially the conservation of wildlife in certain ways. Thus, 100% of the respondents agreed that poaching always led to depopulation of wildlife species in the Park. This finding agrees with reports made by other scholars. For instance, Holthujjzen (2013) reported that wildlife poaching has negative side effects that affect local communities, wildlife populations, and the environment. It is a crime fueled by a lucrative black market trade of animal parts. Another 92.9% agreed that it also led to decreased tourists activities in the Park. Obviously, a community that heavily relies on its wildlife to attract tourists is at great risk of economic hardship if the prevalence of poaching persists particularly for the fact that a tourist boycott due to local poaching is now perceived as a real threat. Certainly, such a boycott could have detrimental effects on the community's economy since restaurants, hotels, rentals, and other attractions would suffer. According to Kill (2015), wildlife is an important asset for the tourism industry, especially in African countries where wildlife-based tourism is an integral component of the tourism product and the destination marketing. Big Five (buffalo, elephant, leopard, lion and rhino) safaris are an established brand and related activities are especially demanded by visitors from overseas.

By killing animals for the trade of body parts, the wildlife tourism industry loses a significant resource, also in economic terms. Thus, poaching is likely to pose a growing threat to the wildlife tourism sector that depends on wildlife richness and the existence of certain species.

Increase in the number of injured and stray animals was also cited as negative consequences of poaching in and around the Park (85.7% and 42.2%) respectively. As stated by the respondents, sometimes, stray animals tend to be one of the greatest threats facing fishermen, hunters as well as crop and livestock farmers around the Park as sporadic cases of casualties have been reported due to encounter with such animals. Other factors believed to affect wildlife conservation negatively by the respondents drop in the Park's revenue possibly due to decreased tourism (64.3%), pollution of the environment by animal carcasses (56.5%) as well as increase in the number of stray animals and reprisal attacks on wildlife by local inhabitants which received 42.2% each. The potentials of poaching to impact tourism activities have been stressed by many other scholars. By killing animals for the trade of body parts, the wildlife tourism industry loses a significant resource, also in economic terms. Thus, poaching is likely to pose a growing threat to the wildlife tourism sector that depends on wildlife richness and the existence of certain species (Kill, 2015).

OPTIONS	Frequency	Percent
Yes	154	100.0
No	0	0
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.8: Response on whether charcoal production is taking place in national park

Based on the wide scale of charcoal production in and around the National Park, 100% of the respondents agreed that charcoal production by the local people takes place within the reserved area. Certainly, bulk of the charcoal production activities in and around the national park were carried out by the majority poor local inhabitants who engage in such acts to acquire some money. Charcoal production is one of the biggest informal businesses in Africa. It is the fuel of choice for the continent's fast growing urban poor, who, in the absence of electricity or gas, use it to cook and heat water. According to the UN, Africa accounted for three-fifths of the world's production in 2012 and this is the only region where the business is growing. It is however, a slow-burning environmental disaster (www.economist.com). Sometimes, charcoal production was also carried out by other people coming from other places far away from the reserved areas. In most cases, the people select dead and dry trees to burn charcoal however; sometimes live trees are cut in the process thereby compounding the menace of deforestation. According to the economist magazine, in the power vacuum of the eastern Democratic Republic of Congo, rampant charcoal logging has destroyed huge swatches of Virunga National Park. That threatens the rare gorillas which tourists currently pay to as much as 400 a day to view, even as it fuels the conflict (www.economist.com). This further confirms the finding made by this study and the impacts of the act also apply to the Kahuzi-Biéga National Park which cause the destruction of many habitats for many wildlife animals.

Reasons	Frequency	Percent
High demand for charcoal	89	57.8
Availability of tree species	56	36.4
Need for money	87	56.5
Ineffective regulations/laws	54	35.1
Weak control measures	56	36.4
High population density	22	14.3
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.9: Reasons for the increased charcoal production in national park (MULTIPLE RESPONSE, N=154)

With regards to charcoal production, table 4.8 above revealed that the most leading cause of charcoal production in and around the National Park was the high demand for it (57.8%). Charcoal is used by many local people as a source of energy for cooking and heating. This is the case in many rural African settings. Sometimes, charcoal happens to be the most demanded fuel even in urban areas. This could be attributed to the fact that charcoal may be cheaper that other sources of energy such as gas, electricity and kerosene. The epileptic power supply in many African rural and urban areas might perhaps encourage the use of charcoal as the best and easiest source of energy to many households. It is the fuel of choice for the continent's fast growing urban poor, who, in the absence of electricity or gas, use it to cook and heat water (www.economist.com). Other reasons cited were the availability of tree species suitable for charcoal production with 26%, need for money by the local nationals (23%), ineffective regulations and laws (35.1%), weak control measures (36.4%) and lastly high population density for which the lowest positive response rate of 14.3% was recorded. Based on the findings made from interviews conducted with some of the respondents, it was revealed that high population pressure resulting from civil wars in some parts of the DRC have turned many places in and around the Park into safe havens for refugees displaced by the war. Therefore, since the refugees were generally poor who could not afford any source of energy, they solely depended on charcoal as the best option. However, poverty seemed to be the driving force behind many of environmentally destructive activities prevalent in many rural settlements especially in Africa. Possibly, lack of basic infrastructure encourages such acts.

Impacts	Frequency	Percent
Reduced rangeland carrying capacity	20	13.0
Biodiversity depletion	10	6.5
Deforestation	85	55.2
Destruction of wildlife habitats	64	41.6
Land degradation	35	22.7
Loss of vegetation cover	88	57.1
Desertification	5	3.2
Drying of water bodies	46	30.0
Total	**154**	**100.0**

Source: Field study, 2018

Table 4.10: Impacts of charcoal production on wild life conservation (MULTIPLE RESPONSE, N=154)

Pearson Linear Correlation Coefficient (PLCC) results of correlation between charcoal production activities and its impacts in the National Park revealed significant relationship; .645 at 0.01 level of significance (2-tailed).

Expectedly, deforestation and loss of vegetation cover were believed to be the leading consequences of charcoal production in Kahuzi-Biéga National Park as cited by the respondents (55.2% and 57.1%) respectively. Although most of the times dead and dry trees were used in the production of charcoal, sometimes live trees were used. Definitely, such acts led to deforestation in the Park. It should be noted that deforestation further compounds the menace of climate change which on its own affects the environment in a varieties of ways. According to the some unconfirmed reports obtained, 3.2% of forest resources were lost annually in and around the Park due to deforestation. Charcoal production for urban consumption is a main driver of forest degradation in sub Saharan Africa. Urban growth projections for the continent suggest that the relevance of this process will increase in the coming decades (Sedano *et al.*, 2016).

Meanwhile, the process of charcoal production produces a lot of smoke (CO_2) which has been identified as one of the main greenhouse gases responsible for climate change and has also led to the death of living organisms. According to Sedano *et al.*, (2016), forest degradation associated with to charcoal production is difficult to monitor and commonly overlooked and underrepresented in forests cover change and carbon emission estimates. Besides, it also exposes the soil by making it vulnerable to harsh environmental conditions such as soil erosion, land degradation and gully formation.

Another impact cited as negative consequence of charcoal production was destruction of wildlife habitats which constituted 41.6%. Consequently, currently much of the areas naturally inhabited by many wildlife have been cleared up. Obviously, trees serve as nitch for many wildlife species such as monkeys hence; cutting down trees could mean loss of habitats for such animals thereby disturbing their ecosystem which in turn affects the animals' biology in many ways. Such human induced habitat destruction could lead to drop in the animals' population by affecting their reproductive cycles. Consequently, the affected animals are being threatened and are forced to run helter skelter in such of favourable habitats while more have moved out of the park to other areas thereby leading to drop in the number of wildlife in the Park. Trivers (2010) stated that, ccharcoal production as it burns wood produces carbon dioxide one of the main greenhouse gases responsible for climate change and destruction of wild life habitats as most of them die due to starvation and high temperature. In addition, charcoal production effects are further complicated by the diminishing natural resilience of the vegetation occasioned by frequent and prolonged drought in the last few years (Fraser & Mathisen, 2012). Other possible impacts of charcoal production in the Park as revealed were reduced rangeland carrying capacity (13.0%), biodiversity depletion (6.5%), drying of water bodies (30.0%), desertification (3.2%) and land degradation (22.7%). Continuous loss of flora and fauna due to charcoal production could certainly lead to detrimental changes in the ecosystem with severe consequences on wildlife conservation. According to Anthony *et al.*, 2009, we need various species of flora and fauna in our environmental ecosystems so that it can maintain healthy and balanced environment for both humans and wildlife to stay in.

Further findings were that charcoal production has resulted into overuse of vegetation and animal intensification. Over exploitation of vegetation occurs mainly through gathering wood for fuel, fencing and construction materials, over grazing of livestock and charcoal production which affects wildlife habitats as most of them are displaced and other die due to starvation and poaching. This is an un-controlled activity which selectively clears trees cover (especially *Acacia busei*). Its effects are further complicated by the diminishing natural resilience of the vegetation occasioned by frequent and prolonged drought in the last few years (Fraser & Mathisen, 2012). Extensive charcoal production in the national park has resulted into reduced rangeland carrying capacity, biodiversity depletion, soil erosion, land degradation and gully formation. Moreover, development of unplanned feeder roads and unplanned water points has increased the number of settlements and increased the wildlife vulnerability to droughts, reduced animal conservation areas and create rangeland resource conflicts (Trivers 2010).

Measures	Frequency	Percent
Use of licenses	111	72.1
Enaction of strict laws and regulations	154	100
Imposition of Fines	78	50.7
Benefit sharing	89	57.8
Relaxation of land tenure system	67	43.5
Compensation of destroyed crops for farmers	122	79.2
Provision of cheap fuels	98	63.6
Entrepreneurial skills for locals	122	79.2
Use of Game Rangers	76	49.4
Fencing the park	43	28.0
Tree planting campaign	107	69.5
Community sensitization	133	86.4
Motivation for Park staff	61	39.6
Total	154	100.0

Source: Field study, 2018

Table 11: Control measures on how to control poaching and charcoal production and enhance wildlife conservation the Park (MULTIPLE RESPONSE, N=154)

In order to determine the respondents perceptions on possible control measures against poaching and charcoal production in the National Park, their views were sought as indicated in the table above. From all the possible measures cited, strict laws and regulations received the highest rate of agreement (100%). Strict laws and regulations can be employed to regulate human conduct and activities with particular emphasis on certain issues such illegal hunting and cutting down of trees. It is believed that, once effective laws and regulations are put in place, poaching and illegal charcoal production and every other illegal human activity in and around the Park can be curtailed. Lack of enforcement and political will often mean such regulatory activities are not effective therefore Regulation on wildlife conservation needs to be complemented by policy measures which provide

incentives to actors to conserve biodiversity and promote sustainable development.

Community sensitization or awareness raising campaigns on the importance of establishing cordial relationship between members of local communities living around the Park and resources of the Park is also a very effective tool that can be employed to address the problems of poaching and charcoal production in the Park. The local communities should be well enlightened on the impacts dangerous human activities such as poaching and charcoal production on the entire environment as well as how they can live side by side in harmony with the Park. They should also be well informed they can benefit from the resources in the Park in very legitimate ways. This is intended to encourage local dwellers around the Park to understand the essence of establishing the reserve area so as to value all resources being conserved there including wildlife species as well as its forest resources. In addition, the local inhabitants most of whom were uneducated should be made to understand the relationship between forest resources in the Park and the wildlife species living in it as well as the dangers involved in destroying trees and vegetation in and around the Park.

It was discovered that sometimes, wildlife species in the Park wreak havoc on the surrounding communities causing destruction of certain properties belonging to the local people or even their deaths especially crop and livestock farmers. These fatalities usually occur in farms or when farmers graze their animals in the bushes. Consequently, human-wildlife conflicts were reported frequently leading to destruction of crops in farms or storage. Thus, the respondents (79.2%) believed that, compensations made to the local people in such cases could reduce tensions and prevent further retaliatory attacks on the Park's wildlife resources.

Based on much of the findings made by this study, poverty seemed to form the baseline for most of the illegal human activities in the National Park especially poaching and charcoal production hence; reduction in poverty rate among the local communities around the Park could be a very effective control measure. Thus, a very good number of the respondents (72.9%) were of the view that provision of entrepreneurial skills to the local people could discourage them from engaging in environmentally devastating activities and broaden their sources of income thereby improving their socioeconomic status. Hence, the urge and desire to engage in illegal activities in the reserved area could be significantly reduced since the main reason to which they attribute encroachment into the Park by many locals was poverty.

Furthermore, it was suggested by the respondents that issuance of authorized licenses for approved human activities within the premises of the National Park might be a very measure of controlling illegal human activities such as poaching and charcoal production in the Park (72.1%). Provision of Licenses or other kinds of permits to carryout human activities can be a typical administrative instrument for the management of natural resources and can be utilized also in relation to wild animals, to authorize hunting or other kinds of uses. Other measures suggested to be effective towards the control of illegal human activities and enhance wildlife conservation within the reserved Park were Tree planting campaigns (69.5%), provision of cheaper sources of energy (63.6%), imposition of fines on defaulters (50.7%) and benefit sharing with the locals (57.8%). Others included use of Game Rangers (49.4%), incentives and motivation for the Park's staff (39.6%), relaxation of land tenure system (43.5%) and lastly fencing the National Park which recorded the lowest rate of agreement (28.0%). According to Watson (2000), tree planting that later turns into natural and artificial forest has the following advantages to wildlife: They provide habitat which is the most obvious, they provide breeding grounds for species that aren't typically common to forests. In addition, going by the findings of this study, some Game Rangers working in the Park have been accused of engaging in the encouragement of some illegal activities in the Park especially poaching hence; effective incentives and motivational strategies could be employed by authorities of the National Park to curtail this menace.

Fencing has taken on an increasingly important role in wildlife management in parts of Africa in recent years, particularly in southern Africa. A number of protected areas in Africa are also partially or completely fenced, with the objective of limiting the movement of wildlife out of, and people into parks (Lindey *et al.*, 2012). Fencing can be a very tool for promoting conservation of wildlife and confers a number of advantages in that respect, among which are enhancing wildlife security and management, helps in disease control and prevents human-wildlife conflicts. However, some disadvantages are inherent with fencing as a control measure in wildlife conservation. Negative consequences of fencing Game Reserves have been reported by many scholars elsewhere. For instance, electrified fencing has implications for animal welfare due to the frequency with which small animals are entangled in fence lines and are killed either through electrocution or dehydration. Fencing may also prevent escape of animals from bush fires. Besides, the confinement of wildlife populations with fencing appears to affect density dependent population regulation, and fenced areas are susceptible to unnaturally high densities of some wildlife, resulting in environmental degradation and the risk of population crashes (Boone and Hobbs 2004 cited in Lindsey *et al.*, 2012)

IV. CONCLUSION

The goal of wildlife conservation is to ensure the sustainable use of natural resources in such a way that future generations will also be able to make use of such resources later and also to recognize the importance of wildlife and wilderness for humans and other species alike. Wildlife conservation has become an increasingly important practice due to the negative effects of human activity on wildlife. Thus, based on the outcomes of this study, it was concluded that, if the current scale of poaching and charcoal production are allowed to continue unchecked in and around Kahuzi-Biéga National Park, the numerous negative consequences inherent with these illegal activities will continue to escalate as well with resultant devastating impacts on the conservation of wildlife species and all other natural resources in the reserved area. Hence, the rationale behind the establishment of the National Game Reserve especially conservation of wildlife

species especially the endangered ones, enhancement of tourism, creation of jobs as well as generation of revenue will just be a mirage.

V. RECOMMENDATIONS

With respect to the findings made and the conclusion drawn, to bring an end to the menace of poaching and charcoal production in Kahuzi-Biéga National Park which seem to be significant threats to the mission of establishing the Park especially the conservation of wildlife species, the control measures described in Table 11 above should be implemented. Besides, current environmental impact assessment of the National Park should also be undertaken in order to fully understand the relationship existing between the Park and the local people living around it. This would provide an objective platform for decision makers to effectively find lasting solutions to the ever increasing problems of poaching and charcoal production in the Park which seem to be the greatest human induced activities threatening the sustainable conservation of natural wildlife resources in Kahuzi-Biéga National Park bearing in mind that some of the wildlife species were already on the endangered species list of the IUCN. It is worthy of note that, current conservation challenges facing the National Park are further worsened by the impacts of climate change which threaten the survival of many wildlife species.

Modern anti-poaching strategies used at Kruger National Park in South Africa led to 96% drop in poaching activities in just two years (www.thesouthafrican.com). Thus, these strategies are hereby recommended for use in Kahuzi-Biéga National Park also for the eradication of poaching activities as well. These strategies include:

- ✓ Created a Wifi "net" – zone that covers the 62,000 hectares of land and provides a fast, secure connection to the internet.
- ✓ Rangers are given tablets to track and monitor movement across the Park.
- ✓ Thermal imaging devices have been planted across the perimeter.
- ✓ Magnetic and acoustic sensors on the 72 km electric fence cab detect even the slightest movement on the outskirts of the Game Reserve.
- ✓ Biometric scanners were introduced at entrances.
- ✓ Sniper dogs and helicopter teams have been used to booster the patrol team.
- ✓ Data collection and analysis has helped formed a comprehensive picture of how poachers move and where they are likely to strike.
- ✓ They have police officers on standby, access to the national database and even lawyers readily available to ensure arrests are executed legally.

REFERENCES

[1] Andrea Kill (2015). Analysis of the interrelation between wildlife tourism and poaching- The case of South Africa - Master thesis at the Faculties of Economics and Landscape Management & Nature Conservation of Eberswalde University for Sustainable Development.
[2] Andrew J. Hansen and Ruth Defries (2007). Ecological mechanism linking protected areas to surrounding lands. Ecological appliocations; 17(4), pp 974-988
[3] Anthony, R.G., R.J. Steidl, and K. McGarigal (2009), Recreation and bald eagles in the Pacific Northwest. In Wildlife and Recreationists: Coexistence through Management and Research. R.L. Knight and K.J. Gutzwiller, eds. Washington, D.C.: Island Press, 223–242.
[4] Boyle, S.A., and F.B. Sampson. 2008. Effects of non-consumptive outdoor recreation on wildlife: A review. Wildlife Society Bulletin 13, 110–116.
[5] Burger, J., C. Jeitner, K. Clark, and L.J. Niles. 2004. The effects of human activities on migrant shorebirds: successful adaptive management. Environmental Conservation 31, 283–288.
[6] Caruthers, J. (2007). Conservation and wildlife management in South African National Parks 1930s–1960s. Journal of the History of Biology, 41(2), 203–236.
[7] Colin A. C. and William O. (2006). Threats to tropical forests. Pp 127-142. University of Chicago press.
[8] Forsyth, C., & Forsyth, Y. (2009). Dire and sequestered meetings: The work of game wardens.
[9] Francl, K.E., and G.D. Schnell.2012. Relationships of human disturbance, bird communities, and plant communities along the land-water interface of a large reservoir. Environmental Monitoring and Assessment 73, 67–93.
[10] Fraser, J.D., L.D. Frenzel, and J.E. Mathisen.2012.The impact of human activities on breeding bald eagles in north-central Minnesota. Journal of Wildlife Management 49, 585–592.Gerrard, J.M., P.N. Gerrard, P.N.
[11] Gerrodette, T. 2009. A power analysis for detecting trends. Ecology 68, 1364–1372. Gill,
[12] Gibson, C. (2009). Politicians and poachers: The political economy of wildlife policy in Africa. Cambridge, UK: Cambridge University Press.
[13] Green, R.H. 2010. Sampling Design and Statistical Methods for Environmental Biologists. New York: Wiley.
[14] Gregoire,T.G., and G.J. Buhyoff. 2010. Sampling and Estimating Recreational Use. General Technical Report PNW-GTR-456. Portland, Ore.: U.S. Department of Agriculture– Forest Service, Pacific Northwest Research Station.
[15] Grier, J.W. 2009.Bald eagle behavior and productivity responses to climbing to nests. Journal of Wildlife Management 33, 961–966.
[16] F Sedano, J A Silva, R Machoco, C H Meque, A Sitoe, N Ribeiro, K Anderson, Z A Ombe, S H Baule And C J Tucker (2016). The Impact of Charcoal Production on Forest Degradation: A Case Study in Tete, Mozambique. Environmental Research Letters; Vol. 11, No 9.
[17] Henson, P., and T.A. Grant (2009). The effects of human disturbance on trumpeter swan breeding behavior. Wildlife Society Bulletin 19, 248–257.
[18] Hess, K., & Hess-Orthmann, C. (2010). Criminal investigation (9th ed.). Cengage learning. New York, NY: Delamar.

[19] Holthuijzen, A.M.A. 2013.Behavior and Productivity of Nesting Prairie Falcons in Relation to Construction Activities at Swan Falls Dam. Boise: Idaho Power Co.
[20] Janmejay Sethy and Prakash C. M. (2015). Biodiversity Conservation research, management; first edition. Himalaya publishing house. Pp 158-173.
[21] Johnson, C.J., M.S. Boyce, R.L. Case, H.D. Cliff, R.J. Gau, A. Gunn, and R. Mulders. (2005). Cumulative effects of human developments on arctic wildlife. Wildlife Monographs 160.
[22] Lichstein, J.W., T.R. Simons, and K.E. Franzreb. 2012. Landscape effects on breeding song-bird abundance in managed forests. Ecological Applications; 12, 836–857.
[23] Lindey P. A., Chap L. M., Andrew L. B. and Stephanie R. (2012). Fencing for conservation: Restriction of evolutionary potential or a riposte to threatening processes. Pp 215-234. Springer, New York.
[24] Mann, S.L., R.J. Steidl, and V.M. Dalton.2012. Effects of cave tours on breeding cave myotis. Journal of Wildlife Management; 66, 618–624.
[25] Mathisen, J. E. 2014. Effects of human disturbance on nesting of bald eagles. Journal of Wildlife Management 32, 1–6.
[26] Noon, B.R. 2003. Conceptual issues in monitoring ecological resources. In Monitoring Ecosystems: Interdisciplinary Approaches for Evaluating Ecoregional Initiatives. D.E.
[27] Trivers, R.L. (2010). Parental investment and sexual selection. In Sexual Selection and the Descent of Man, 1871–1971. B. Campbell, ed. Chicago: Aldine, 136–179.
[28] Obour, Richard and Asare, Richard and Ankomah, Paul and Larson, Trent (2016). Poaching and its potential to impact wildlife tourism: An assessment of poaching trends in the Mole National Park in Ghana. Arthens Journal of Tourism. 3. 169-192. 10.30958/ajt.3-3-1.
[29] Peter A. Lindsey, Chap L. Masterson , Andrew L. Beck , and Stephanie Romañach (2012). Ecological, Social and Financial Issues Related to Fencing as a Conservation Tool in Africa.
[30] Richard Obour, Richard Asare, Paul Ankomah, Trent Larson (2015). Poaching and its Potential to Impact Wildlife Tourism: An Assessment of Poaching Trends in the Mole National Park in Ghana. Athens Journal of Tourism; Volume 3, Issue 3; Pages 169-192
[31] Watson, A.E., D.N. Cole, D.L. Turner, and P.S. Reynolds (2000), Wilderness Recreation Use Estimation: A Handbook of Methods and Systems. General Technical Report RMRSGTR-56. Ogden, Utah: U.S. Department of Agriculture–Forest Service, Rocky Mountain Research Station.
[32] Sedano F., J.A. Silva, R. Machoco and C. H. Meque, A. Sitoe, N. Ribeiro, K. Anderson, Z. A. Ombe, S. H. Baule and C. J. Tucker (2016). The impact of charcoal production on forest degradation: A case study in Tete, Mozambique. Environmental Research Letters, Vol. 11(9).
[33] Steidl, R.J. (2001). Practical and statistical considerations for designing population monitoring programs in Wildlife, Land and People: Priorities for the 21st Century. R. Field, R.J.
[34] www.globalcitizen.org Accessed 5:10 pm 04/03/2019
[35] www.economist.com Accessed 8:08 pm 04/03/2019
[36] www.thesouthafrican.com Accessed 5.23 pm 03/03/2019
[37] www.ugandawildlife.org Accessed 5.23 pm 03/03/2019